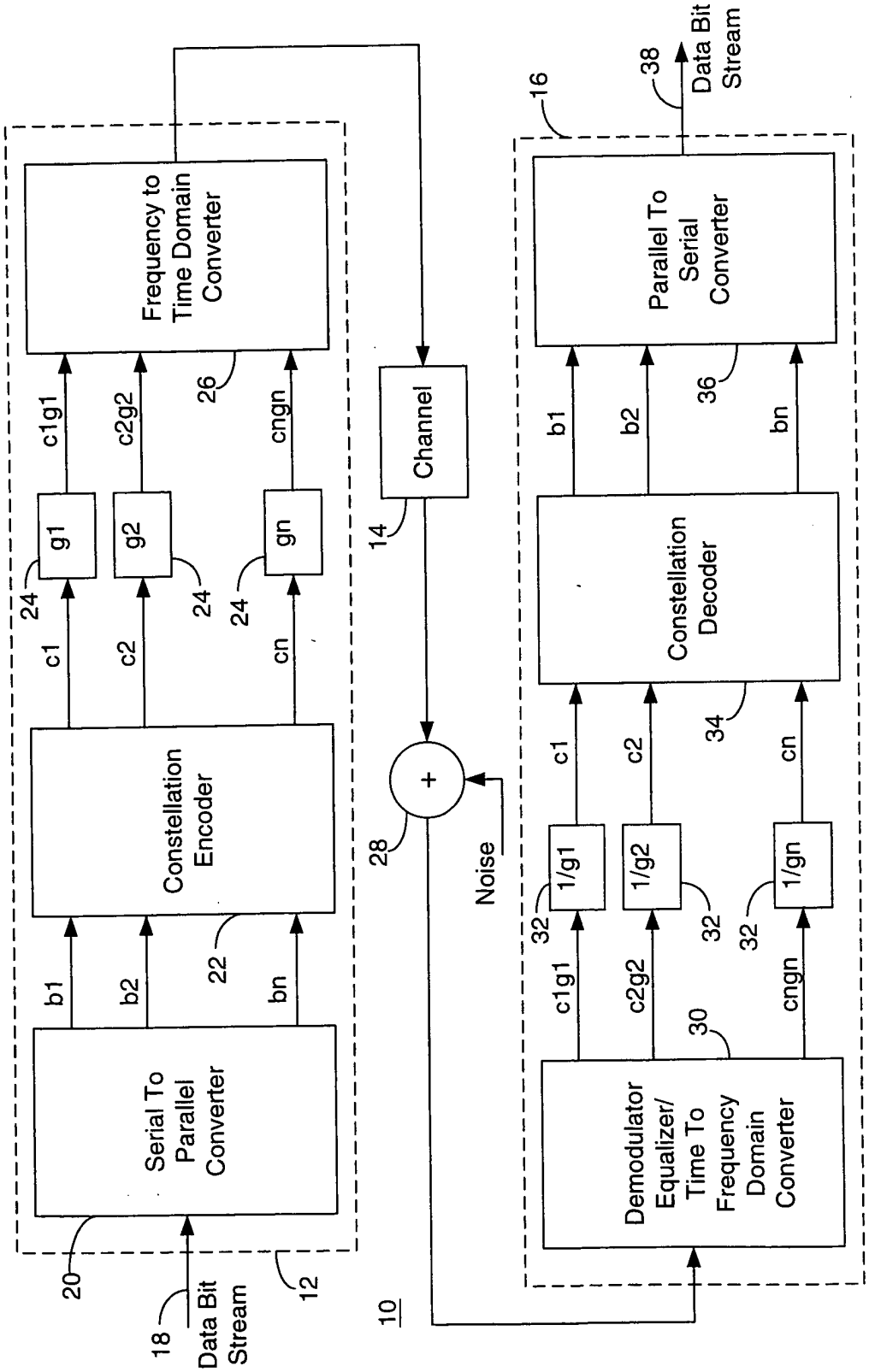

Data Bit Stream
18
20
Serial To Parallel Converter
b1
b2
bn
22
Constellation Encoder
c1
c2
cn
24
g1
g2
gn
c1g1
c2g2
cngn
26
Frequency to Time Domain Converter
12
10
Channel
14
+
28
Noise
16
Demodulator Equalizer/ Time To Frequency Domain Converter
30
32
1/g1
1/g2
1/gn
34
Constellation Decoder
36
Parallel To Serial Converter
38
Data Bit Stream

Fig. 1

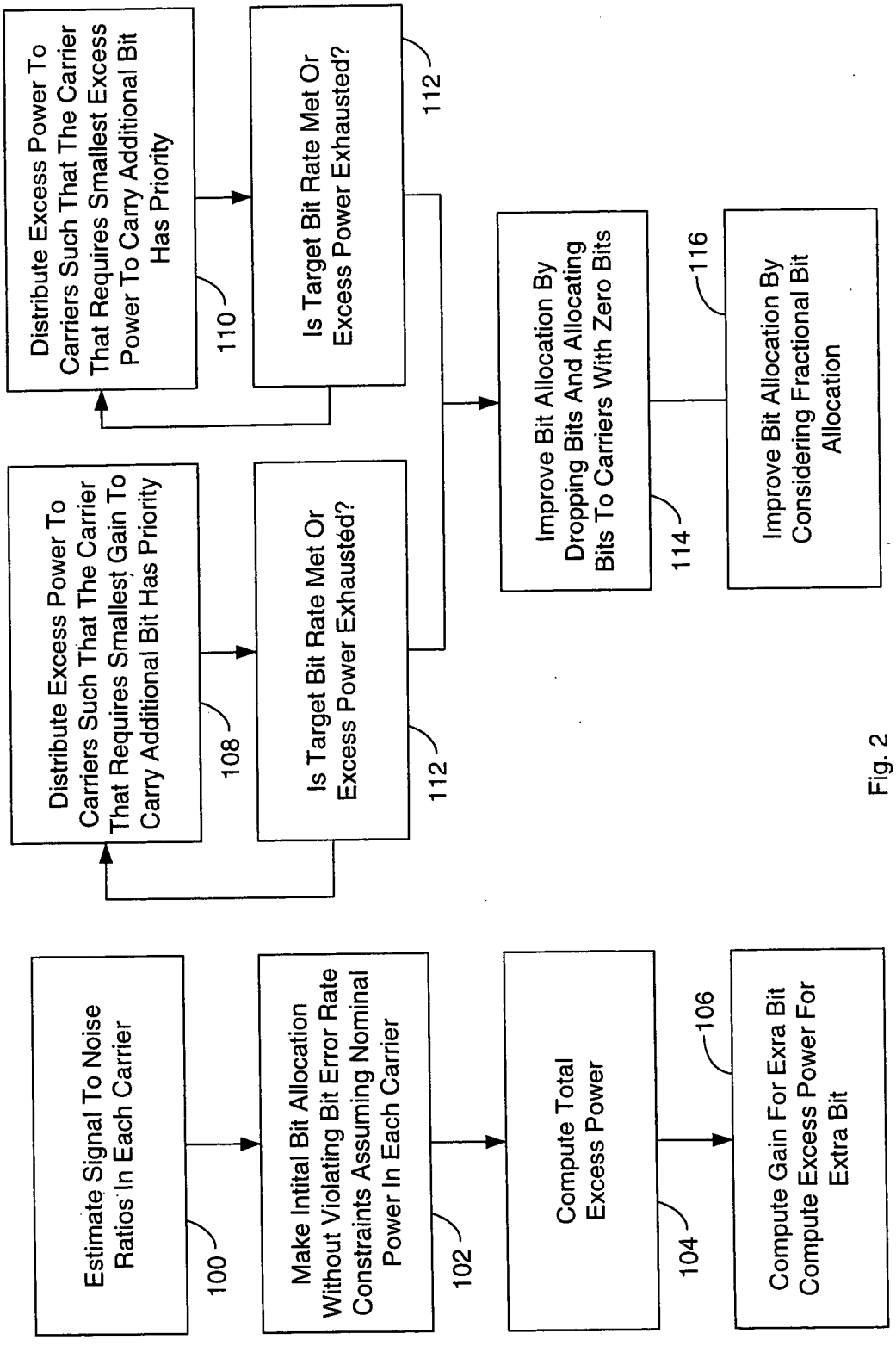

Estimate Signal To Noise Ratios In Each Carrier
100
Make Initial Bit Allocation Without Violating Bit Error Rate Constraints Assuming Nominal Power In Each Carrier
102
Compute Total Excess Power
104
Compute Gain For Exra Bit Compute Excess Power For Extra Bit
106
Distribute Excess Power To Carriers Such That The Carrier That Requires Smallest Gain To Carry Additional Bit Has Priority
108
Is Target Bit Rate Met Or Excess Power Exhausted?
112
Distribute Excess Power To Carriers Such That The Carrier That Requires Smallest Excess Power To Carry Additional Bit Has Priority
110
Is Target Bit Rate Met Or Excess Power Exhausted?
112
Improve Bit Allocation By Dropping Bits And Allocating Bits To Carriers With Zero Bits
114
Improve Bit Allocation By Considering Fractional Bit Allocation
116

Fig. 2

Tone	1	2	3	4	5	6	7	8	9	10	11
BRM	0	1(0000)	0	1(0001)	1(0000)	1(0001)	1(0010)	0	0	1(0000)	1(0010)

Fig 3.

Tone	1	2	3	4	5	6	7	8	9	10	11
BRM	0	1(0)	0	1(1)	1(00)	1(01)	1(10)	0	0	1(00)	1(10)

Fig 4.

Tone	1	2	3	4	5	6	7	8	9	10	11
BRM	0	1 (0101)	0	1 (0110)	1 (1010)	0	1 (1011)	0	0	0	0

Fig 5.

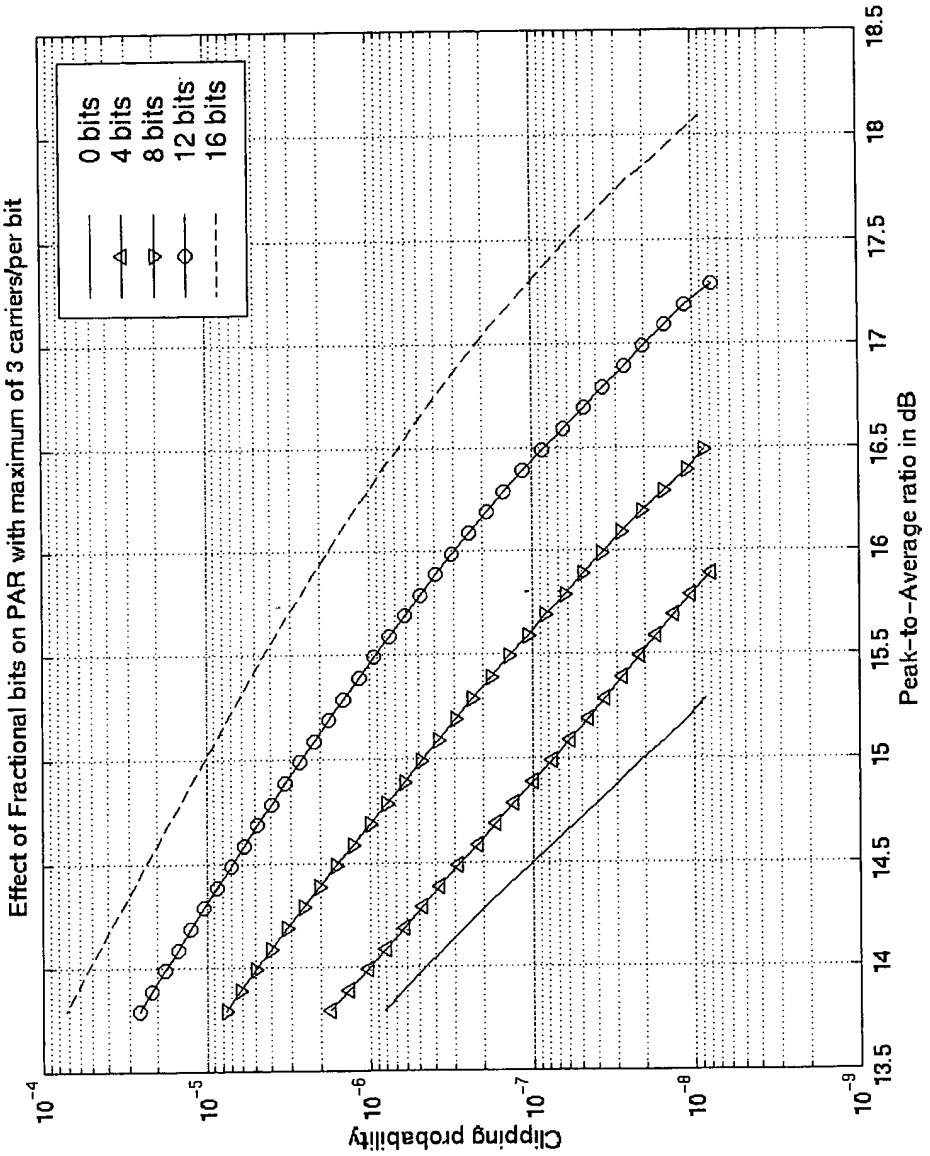
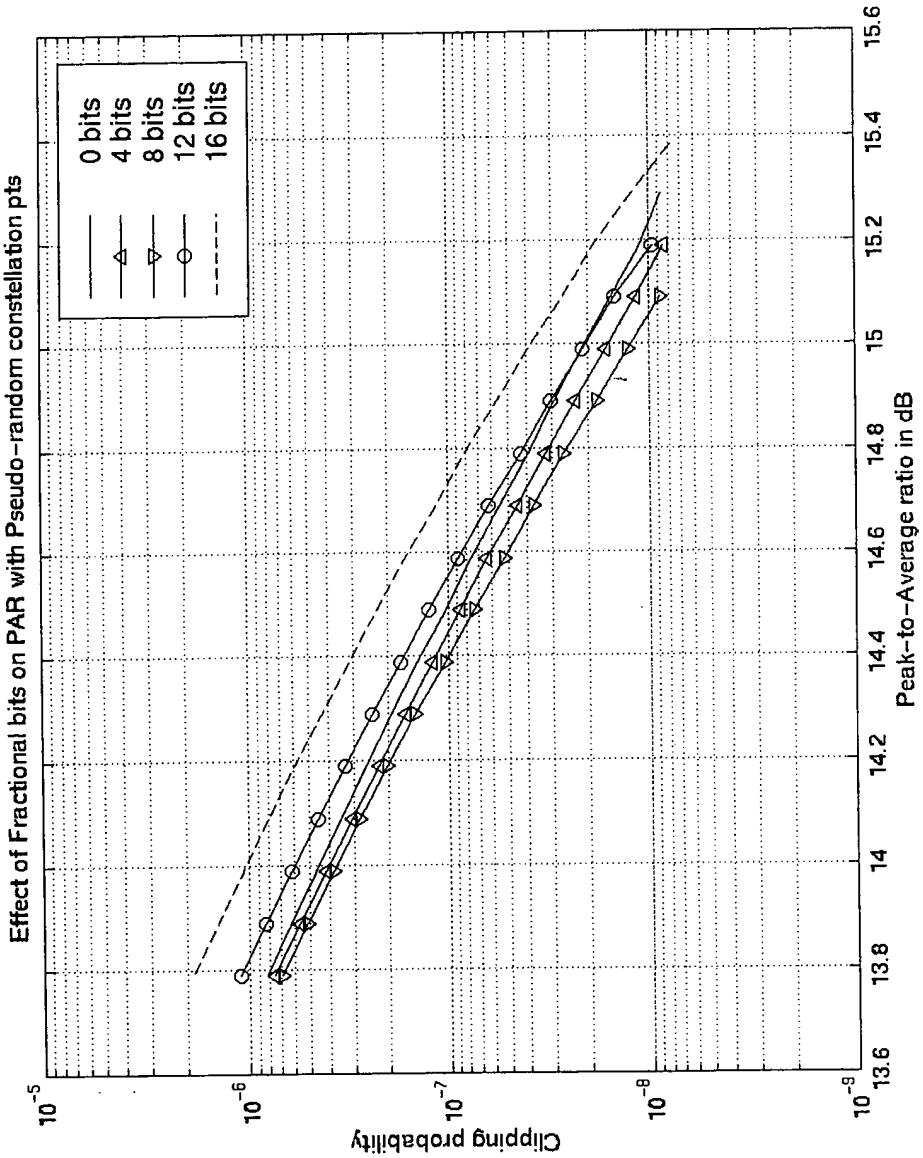

Effect of Fractional bits on PAR with maximum of 3 carriers/per bit
0 bits
4 bits
8 bits
12 bits
16 bits
Clipping probability
Peak-to-Average ratio in dB
10^-4
10^-5
10^-6
10^-7
10^-8
10^-9
13.5
14
14.5
15
15.5
16
16.5
17
17.5
18
18.5

Fig. 6

Fig. 7


Effect of Fractional bits on PAR with Pseudo-random constellation pts
0 bits
4 bits
8 bits
12 bits
16 bits
Clipping probability
Peak-to-Average ratio in dB
10^-5
10^-6
10^-7
10^-8
10^-9
13.6
13.8
14
14.2
14.4
14.6
14.8
15
15.2
15.4
15.6